

Walrus Islands State Game Sanctuary Annual Report 2005



Diane Calamar Okonek and Marian Snively
Alaska Department of Fish and Game
Division of Wildlife Conservation
333 Raspberry Road, Anchorage, Alaska 99518

December 2005

TABLE OF CONTENTS

Table of Contents	i
List of Figures	ii
List of Tables	iii
List of Appendices	iii
Executive Summary	1
Introduction.....	2
Methods and Materials.....	2
Staffing.....	2
Visitor Program.....	3
Access Violation/Walrus Disturbance	3
Wildlife Surveys and Monitoring	4
Walrus Surveys	4
Sea Lion Survey.....	5
Seabird Monitoring	5
Other Observation/Projects.....	5
Trail Additions and Improvements	5
Cabin Improvements.....	6
Remote Cameras	6
Subsistence Hunt.....	6
Results and Discussion	6
Staffing.....	6
Visitor Program.....	6
Access Violations/Walrus Disturbances	7
Wildlife Surveys and Monitoring	8
Walrus Surveys	8
Sea Lion Survey.....	9
Seabird Monitoring	9
Other Observations/Projects	10
Trail Improvements and Additions	10
Cabin Improvements.....	11
Remote Internet Video Camera	11
Sea Lion camera.....	12
Ivory Collection	12
Exotic Species.....	12
Subsistence Hunt.....	12
Recommendations.....	13
Acknowledgements.....	13
Literature Cited.....	14
Figures.....	15
Tables.....	29
Appendices.....	32

LIST OF FIGURES

Figure		Page
Figure 1	Map of northern Bristol Bay showing the location of Round Island and the Walrus Islands State Game Sanctuary.	15
Figure 2	Map of Round Island with locations of walrus haulout beaches, bird plots and sea lion site.	16
Figure 3	Pelagic cormorant productivity plots at Second Beach, Round Island 2005.	17
Figure 4	Pelagic Cormorant productivity plots at Second Prime Beach, Round Island 2005.	18
Figure 5	Black-legged kittiwake productivity plots at Observation Point, Round Island 2005.	19
Figure 6	Common Murre productivity plots at Observation Point on Round Island, 2005.	20
Figure 7	Seabird productivity plots at Observation Point for total population counts of five species of seabirds.	21
Figure 8	Sea lion haulout camera and view of haulout at East Cape, Round Island 2005.	22
Figure 9	SeeMore satellite video camera and crewmember at Observation Point, Round Island 2005.	22
Figure 10	Visitor numbers, Round Island 1977-2005.	23
Figure 11	Disturbance caused by three highflying jets, Round Island 2005.	24
Figure 12	Fresh carcass, with massive bruising, found after a serious disturbance caused by a thunderstorm, Round Island 2005.	25
Figure 13	Peak walrus counts, Round Island 1972-2005.	26
Figure 14	Stairway leading from Boat Cove up the rock face to the main trail system, Round Island 2005	27
Figure 15	Hardware cloth covering boardwalk (a), and geo blocks (b), were some of the trail improvements to add safety and decrease erosion, Round Island 2005.	27
Figure 16	Cabin floor with mold and wood rot, located in the back room of the Round Island cabin.	28

LIST OF TABLES

Table		Page
Table 1	Visitation to Round Island for ten years preceding 2005.	1
Table 2	Country/state of origin of visitors, Round Island 2005.	2
Table 3	Walrus response to anthropogenic and natural stimuli, Round Island 2005.	3
Table 4	Productivity of three indicator seabird species Round Island 2005.	3
Table 5	Chick count for five seabird species conducted on August 8 at Observation Point, Round Island 2005.	3

LIST OF APPENDICES

Appendix		Page
Appendix A	Data collection protocols for Bristol Bay walrus monitoring, Round Island 2005.	32
Appendix B	Walrus count protocols for Bristol Bay walrus haulout monitoring program, Round Island 2005.	37
Appendix C	Anthropogenic activities and natural occurrences, Round Island 2005.	39
Appendix D	Walrus counts, Round Island 2005.	40
Appendix E	Steller sea lion counts, identifications, and comments. Round Island 2005.	42
Appendix F	Seabird population counts from Observation Point, Round Island 2005.	44

EXECUTIVE SUMMARY

The Walrus Islands State Game Sanctuary protects one of the largest terrestrial haulout sites in North America for Pacific walrus (*Odobenus rosmarus divergens*). The sanctuary also protects important habitats for several species of seabirds, Steller sea lions (*Eumetopias jubatus*) and other marine and terrestrial birds and mammals. The Alaska Department of Fish and Game (ADF&G) manages the sanctuary primarily to protect these important habitats and wildlife species, and secondarily to provide for public use and enjoyment of these resources.

Through a Cooperative Agreement, the ADF&G and the U.S. Fish and Wildlife Service (FWS; who has primary management jurisdiction over walruses) staff Round Island through the summer months to protect and monitor walruses and other wildlife and to operate a visitor use program. In 2005, FWS funded the transportation and food for the volunteer staff.

Walrus counts for the 2005 field season were conducted from May 17 to August 13. The maximum mean walrus count was 2,195. This season had one of the lowest walrus numbers since 1998 with a mean count of 630.

Sanctuary staff monitored populations and productivity of several nesting seabird species and provided these data to the FWS and U.S. Geological Survey for use in their statewide seabird monitoring programs. Steller sea lions were also monitored at their Round Island haulout site. These data along with brand and flipper tag resightings were provided to the ADF&G Marine Mammal Program for use in their statewide monitoring program.

There were 40 visitors to Round Island in 2005, which is approximately 56% below the mean annual number visitors from the preceding ten-year period (90). Of these, 19 were day visitors and 21 were multi-day campers. Although there was a slight increase in camper numbers from the 2005 field season (increase of two visitors), there was approximately a 65% decrease in day-visitors (decrease of 36 visitors). There were no known sanctuary violations during the 2005 field season.

Two camera systems were set up on Round Island one for monitoring the Steller sea lion haulout and another to provide live Internet footage of walruses on two of beaches at Round Island. Development of the trail system was an intensive project and included building a stairway, adding boardwalk trails, rerouting trails, and adding new trails.

INTRODUCTION

The Walrus Islands State Game Sanctuary was created in 1960 by the Alaska State Legislature. The sanctuary protects a group of seven small islands and their adjacent waters in northern Bristol Bay, approximately 80 miles southwest of Dillingham (Fig 1). The primary purpose of the sanctuary at the time of its creation was to protect the last remaining terrestrial haulout for Pacific walruses (*Odobenus rosmarus divergens*) in North America (Alaska Statute 16.20.090). All other haulouts had been abandoned due to anthropogenic disturbances, mostly related to commercial hunting.

Today, the sanctuary continues to provide important habitat for walruses and comprises one of four primary active haulout sites in Bristol Bay. The sanctuary also protects important habitats for many species of seabirds, Steller sea lions (*Eumetopias jubatus*), and other marine and terrestrial birds and mammals.

The Alaska Department of Fish and Game (ADF&G) manages the sanctuary primarily to protect these habitats and wildlife species, and secondarily to provide for public use and enjoyment of these resources including the opportunity for scientific and educational study, viewing, and photography. Since 1985, all access to Round Island and its surrounding waters requires an access permit and restrictions have been placed on visitor numbers and their activities (Alaska Administrative Code 5 AAC 92.066).

Through a Cooperative Agreement, initiated in 1993, the ADF&G and the U.S. Fish and Wildlife Service (FWS; who has primary management jurisdiction over walruses) staffed Round Island through the summer to protect and monitor walruses and other wildlife and to operate the visitor use program. Although a FWS field technician did not staff the island in 2005, funding was provided for volunteer travel and food. Staff and volunteer duties consisted primarily of the protection of sanctuary resources; enforcement of sanctuary laws, regulations and policies; monitoring of sanctuary wildlife including walruses, seabirds, Steller sea lions and other species; managing the visitor use and access permit program; and maintaining and improving trails and facilities used by staff and visitors.

METHODS AND MATERIALS

STAFFING

Sanctuary manager Diane Okonek (ADF&G) and volunteer Brian Okonek (ADF&G) arrived on Round Island May 15. A helicopter, piloted by Mark Stanton, was used to transport staff and personal gear to the island. The F/V Jazz, operated by Fritz Johnson of Dillingham, transported 4,000 pounds of gear to the island. Efforts were coordinated between parties to transfer 22 loads of gear, which were slung by a Pollux Aviation R44 helicopter, from the boat deck to the island.

Throughout the summer, volunteers were tasked with trail building and maintenance,

sanctuary duties, or a combination of the two. Sandy Kogl and Bill Gossweiler were involved with sanctuary duties, Deb Brocke, Jeff Robinson, and Tammy Olsen were involved with trail duties, and Betty Menard and Brian Okonek were involved with both sanctuary duties and trail duties.

Malcolm Gaylord and Matt Paul, engineers with SeeMore Wildlife Systems, Inc., arrived on Round Island on May 23 and departed May 31. During this time they installed two cameras as part of a remote video camera project: one at First Beach, ten feet directly below the view point; and one at Observation Point bluff, approximately 60 feet below the view point. They also installed solar panels, a satellite dish, wind generator, microwave dish, two gel cell batteries, and electronic boxes. Although the crew was finished with their work on May 26, inclement weather delayed their departure until May 31.

The University of Alaska, Fairbanks (UAF) obtained a scientific permit to collect samples from Round Island. Instructor John Burns and a UAF student came ashore for three hours to collect tissue samples from two dead walruses for the University's museum.

VISITOR PROGRAM

Visitors were permitted to arrive on Round Island after obtaining a permit from the ADF&G Dillingham office, or through verbal authorization using radio communication from sanctuary staff between 0800 and 0900 hours. An access permit was obtained upon their arrival on Round Island.

One of the primary goals of the sanctuary staff was to manage a visitor use program and to balance the quality of the experience for the visitors while protecting wildlife and other resources. Educating the visitors was one of the ways to achieve this goal. When visitors arrived on Round Island, they were briefed on the rules and regulations of the island, given a brief history of the Sanctuary, and given guidelines to approaching walrus viewpoints with minimal disturbance to the animals. All visitors were required to remain on established trails with the exception of going to the summit from the East Cape. To minimize disturbance, visitors were not permitted on the beaches except for island arrival and departure from Boat Cove or an alternative site at Camp Ground Beach. Other duties involved with the visitor program included monitoring the marine radio, authorizing access to sanctuary waters, issuing permits, collecting user fees, reviewing sanctuary rules and safety procedures, answering visitor questions, and improving and maintaining visitor facilities. For the safety of the visitors, the precipitous and slippery nature of the trails was described and recommendations for their use were relayed. Emergency notification phone numbers were collected and an assumption of risk form was signed by each visitor.

ACCESS VIOLATION/WALRUS DISTURBANCE

To protect sanctuary wildlife and other resources, access to Round Island and the waters within three nautical miles of the island were restricted to those possessing permits from ADF&G. Boats were allowed to access the island by utilizing a designated corridor on the

northeast side of the island. Since low-flying aircraft can cause major disturbances at walrus haulouts (Fay 1982), aircraft access to the island was discouraged and ADF&G requested all pilots to avoid flights below 5,000 ft Above Ground Level (AGL) within three miles of the island. Boats or planes observed within the restricted areas were hailed through VHF marine radio and told of the restrictions or advisories. Although ADF&G does not have the authority to regulate airspace, pilots who harass walruses can be prosecuted by the FWS under the Marine Mammals Protection Act (MMPA).

Sanctuary staff documented all access violations and initiated an immediate response when appropriate. The assistance of the Alaska State Troopers, FWS Law Enforcement, and the Federal Aviation Administration (FAA) were requested as needed.

Staff monitored and documented the response of walrus to both authorized and unauthorized access and other activities. The number of walruses affected and the degree of their response were recorded using three distinct behaviors (head raising, reorienting, and dispersing) as measures of quantifying increasing levels of disturbance (Salter 1979). When guides brought in day visitors to the island, each arrival and departure were counted as two different anthropogenic activities

WILDLIFE SURVEYS AND MONITORING

WALRUS SURVEYS

Established Round Island protocols were followed when collecting daily weather and other information (App A). While still at the cabin site and immediately preceding the walrus counts, wind speed and direction, percent cloud cover, and amount and type of precipitation were recorded. Maximum and minimum daily temperature was recorded at 1400 hrs and the barometric pressures were recorded daily at 0800 and 2000 hrs. At the beginning of each beach count the Beaufort Sea state, start and end time, method, beach condition and tide were recorded

Walruses were counted on five randomly selected days each week throughout the summer using standardized methodology provided by FWS (App B). Opportunistic counts were also completed on non-count days as time permitted. There were ten different haulout sites counted once per day. On the East side of the Island, nine beaches were counted beginning with Second Prime (SP), Second Beach (S), First Prime (FP), First Beach (FB), Campground (CG), Boat Cove (BC), Flat Rock (FR), North Boat Cove (NBC), and ending with Main Beach (MB; Fig 2). Due to the exposed and steep terrain on the Traverse Trail leading to West Main Beach, it was not counted during inclement weather. West Main Beach South (WMBS) is only visible by skiff and was counted a single time during the summer of 2005. This is a small site and missing it does not significantly alter the total walrus counts for Round Island (Cody 2003).

SEA LION SURVEY

A small Steller sea lion haulout located at East Cape was monitored at five-day intervals and opportunistically from three different observation points, and once by skiff. Branded animals and those possessing flipper tags were documented and photographs were taken by digital camera provided by ADF&G's Marine Mammal Program. Injuries, entanglements, suckling behavior, and any unusual conditions were noted.

SEABIRD MONITORING

Three species of colonial nesting seabirds were monitored throughout the summer at several sites on Round Island. Nesting chronology and nest productivity data were collected for the following species of seabirds; pelagic cormorants (*Phalacrocorax pelagic*; PECO), black-legged kittiwakes (*Rissa tridactyla*; BLKI), and common murre (*Uria aalge*; COMU). The surveys began in early June and terminated at the end of the season. PECO plots were established at Second Prime and Second Beach (Figs. 3 and 4) and COMU and BLKI plots were established on Main Beach near Observation Point (Figs. 5 and 6). Photographs were taken of the plots and nests from each plot were randomly selected for monitoring. Five plots were monitored every other day and the number of adults, eggs, and chicks were recorded. These data were provided to the FWS Migratory Bird Management office and the U.S. Geological Survey for inclusion in their statewide seabird-monitoring program.

Population counts of five species; PECO, BLKI, COMU, and tufted (*Fratercula cirrhata*; TUPU) and horned (*Fratercula corniculata*; HOPU) puffins; began at the observation of the first egg (early June) and were duplicated every third day for ten days totaling ten counts on Main Beach near Observation Point (Fig. 7). One chick count was conducted for PECO, BLKI, and COMU at the same location on August 7.

OTHER OBSERVATION/PROJECTS

General and unusual observations were recorded and included first wildlife and blooming plant sightings, the presence of beach cast-marine mammals, and general environmental conditions. Walrus mortalities were documented, as were the amounts and locations of ivory collected. Ivory from beach-cast walrus carcasses was collected to discourage unauthorized off-season access to the island. The collected ivory was donated to the Eskimo Walrus Commission (EWC) and then sold to Alaskan native carvers. The proceeds from the sales were deposited into the Pacific Walrus Conservation Fund, which supports walrus conservation efforts in the form of educational, research, and management projects.

TRAIL ADDITIONS AND IMPROVEMENTS

A grant issued through the Alaska Department of Natural Resource, Division of Parks and Outdoor Recreation, and the National Park Service, National Natural Landmark Program, as well as work provided by a volunteer staff enabled improvements and maintenance of the existing trails and addition of new boardwalks and trails. The trail improvements and additions involved: building a stairway from Boat Cove to the main trail system; boardwalk additions and improvements; the addition of Geoblock™ panels; and trail additions,

maintenance, and rerouting.

CABIN IMPROVEMENTS

Several projects to improve the cabin and its facilities were necessary for the 2005 field season. Floor joists and oil tanks needed replacing, fuse panels installed, and batteries moved.

REMOTE CAMERAS

Round Island staff installed a Nikon camera, designed by Scientific Fisheries, in a waterproof box mounted to the rocks below the first visitor viewpoint by the sea lion haulout. Digital photos were taken, one every 15 minutes, from the main haulout rock (Fig 8). This data was provided to ADF&G's Marine Mammals Program for inclusion in their statewide monitoring program.

A remote satellite video camera system with auxiliary remote transmitting capabilities was installed at two locations on Round Island. The transmitting capabilities allow authorized persons to access the camera system, view the walrus haulout beaches, and to remotely control the camera view (Fig 9). This project was funded through grants from FWS (Coastal Conservation Grant Program), Pacific Walrus Conservation Fund, and the National Park Service.

SUBSISTENCE HUNT

During September of 2005, Mary Cody of USF&WS and Helen Chythlook of BBNA (Bristol Bay Native Association) monitored the annual Qayassiq Walrus Commission's walrus subsistence hunt. During this time they completed walrus counts, sea lion counts, and collected walrus hunt data.

RESULTS AND DISCUSSION

STAFFING

The 2005 Round Island field season had a very successful volunteer program. Seven volunteers helped the ADF&G staff member to monitor the wildlife and other resources, manage the sanctuary, and to improve the trail system. The volunteers spent a total of 535 hours on trail maintenance and improvements (including stairway construction).

VISITOR PROGRAM

Forty visitors came to Round Island in 2005, which is 56% below the mean annual number of visitors (90) from the preceding ten-year period (Table 1). Of these, 19 were day-visitors and 21 were multi-day campers. While there was a slight increase in camper numbers from the 2004 field season (increase of two visitors), there was approximately a 65% decrease in day-visitors (decrease of 36 visitors). There were 119 visitor/days totaled for the island during the summer of 2005. Twelve of the sixteen campers that came to Round Island this season were Alaskans. Of the 19 day visitors, excluding the guides, none were from Alaska. The

day visitors were from the following states in the U.S.: Montana, New York, Oklahoma, Pennsylvania, Vermont, West Virginia. Visitors also came from Germany, Italy, London, South Africa, Spain, and Switzerland (Table 2).

Annual visitor numbers at Round Island have decreased from a high of 303 in 1977 to this year's low of forty (Fig. 10). The high visitation of 1977 was due to the approximately 250 day visitors that were ferried to the island from a small cruise ship. In the 1980's and early 90's, many members of the herring fishing fleet would visit Round Island. After the decline of this fishery in Bristol Bay, a drop in visitation was observed. The mean number of independent day-visitors from 1980-1993 was 96, this number decreased to 24 during the years spanning 1994-2005.

There were 131 campers in 1987, which represents the highest count recorded. The number of campers to the island remained high during the late 1980's and early 1990's. During this time, there was national and international publicity of the sanctuary through television programs and magazine articles (Rice 2002). Yearly fluctuations may also be attributed to the availability of transporters to the island, national and international economic conditions, and funding availability for staffing the island (Koenen and Rice 1996).

In 2005, uncertain transportation and available dates to get to the island may have contributed to the all-time low numbers of visitors. Before the summer of 2004, visitors arrived by floatplane to Nunavachak Lake located along the mainland, approximately fifteen miles north of Round Island. A skiff would then transport the visitors and gear to the M/V Inconnu, which would complete their trip to Round Island. This was an efficient method of transporting visitors and gear to Round Island until a winter storm in 2003 caused waves to erode the lake's berm, allowing its water to drain from the basin. In the summer of 2005 Tikchik Airventures used Eagle Lake to fly people to meet the M/V Inconnu. Eagle Lake is only twelve miles from Round Island and made an appropriate rendezvous site to transport visitors and gear to the M/V Inconnu. This route became an option after some visitors already booked alternate and logistically more difficult routes to Round Island. These visitors were obligated to stay with their original plans.

ACCESS VIOLATIONS/WALRUS DISTURBANCES

There were 47 anthropogenic activities that were recorded in 2005: 17 activities were associated with reactions from walrus, 19 activities had no reaction, and ten activities had no walrus present on associated beaches (Table 3). Most activities, 41/47, were in the form of boat trafficking and were relatively minor. Nine of the boating activities caused head raises as the most severe disturbance behavior, three activities caused dispersing behavior, and 19 had no visible affect on the animals. On July 2, three jets flew over the island at an altitude of at least 30,000 ft. (Fig. 11). This occurrence caused the most severe reaction from the animals compared to all other human activities observed from 2005. Observers recorded that the entire herd was disturbed with 134 dispersals and 40 head raises (App C). The sound from the jets reverberated against the cliffs may have increased the disturbance potential for

the animals. A natural occurrence, a thunderstorm, occurred on June 28 and resulted in the dispersal of 16 animals from First Beach and four from Boat Cove. Immediately following the thunderstorm researchers observed 300 agitated walruses on Main Beach. Two days following the storm two fresh walrus carcasses were found: one on Main Beach and one on First Beach. The researchers noted that one animal had massive bruising around its head, neck, and anus that may have been a result of the disturbance caused by the thunderstorm (Fig. 12).

Boat operators, guides, and visitors did what was recommended by staff to keep anthropogenic disturbances to a minimum. Boat operators made a practice of approaching the island slowly, to minimize noise impact, and to anchor well offshore when walruses were present on the adjacent beaches. Boat cove was used by the guides, staff, and visitors during arrivals and departures except for times when walruses were present. To decrease impact to the animals, Campground Beach was used as an alternative route to and from the island trail system.

WILDLIFE SURVEYS AND MONITORING

WALRUS SURVEYS

Walrus counts for the 2005 field season were conducted from May 17 to August 13. All beaches along the east side of Round Island were counted 80 out of the total 88 days, and West Main beach was counted 64 days. On June 3, staff performed a boat count, which included 225 animals from West Main South Beach and totaled 1,075 animals for the entire island. On May 19, the maximum count of walruses on the island was 2,195 and on July 19, the minimum count, which includes West Main Beach, was 124 animals. On June 22, the maximum count on West Main was 560 animals and the minimum count was zero, which occurred 18 times throughout the field season (App. D). Although the 2005 field season had a slight increase in walrus mean counts (630) compared to last year (549; Helfrich and Meehan 2004). The number of walruses on the haulouts in 2004 and 2005 was typically below what has been observed in previous years.

The annual peak count of walruses at Round Island varies significantly between years with the highest number documented estimated at 15,000 during a 1978 aerial survey. The lowest annual peak count was 1,746 walruses in 1998 (Raymond 1998). The maximum counts vary considerably between years and is attributed to the movement of walruses between several Bristol Bay haulouts and not necessarily to population fluctuations. During the mid-1900's, with the exception of Round Island, all terrestrial haulouts were abandoned. This abandonment was presumably caused by commercial hunting pressure as well as other disturbances (Fay 1982). As walruses reestablished use of their traditional haulouts, fewer animals used Round Island at any one time as evidenced by the general decline in peak walrus numbers at Round Island over the past three decades.

Cape Seniavin, in southern Bristol Bay on the Alaska Peninsula, has been monitored by FWS

opportunistically since 1998. FWS staff monitored this haulout in July of 1998, 1999, 2001, and 2003 (Bristol Bay Native Association and FWS). The peak walrus numbers increased at this haulout with a count of 1,785 in 1998 (Kruse and Jack 1999), and a count of 3,127 in 2003 (Snively 2003). The shift in walrus distribution away from haulout sites in northern Bristol Bay may be food related and it is unknown whether it reflects a short or long-term shift in distribution.

SEA LION SURVEY

Round Island Steller sea lions typically haulout at East Cape, located on the eastern tip of the island. Forty-eight combined water and land counts were conducted from three vantage points. The maximum count of 270 sea lions occurred on May 18 and the minimum count of 22 occurred on July 28. Thirty-seven brands and three flipper tags were documented and photographed at the haulout. Seven of the same branded sea lions were observed during ten counts, one Russian brand was observed during seven counts, and one sea lion from Forrester Island (on the Canadian/Alaskan border) was observed during four counts. All sea lion data were given to ADF&G Marine Mammal Division for their annual sea lion monitoring program (App E).

SEABIRD MONITORING

Pelagic cormorant productivity monitoring for the 2005 field season was conducted from May 20 through August 12. Plots were established on Second Prime (SP) and Second Beach (SB). On the first observation day, 21 eggs were counted in the 12 nests at SP. The first chick was observed on June 20 and the maximum chick count on July 19 was 36. On the first observation day, two eggs were counted in the nine nests at SB. Twelve more nests were added to SB on June 1 totaling 21 nests. The first chicks (6) were observed on June 25, and the maximum chick count of 37 was recorded on July 25 (Table 4).

Black-legged kittiwake productivity monitoring for the 2005 field season was conducted from June 4 through August 12. Two plots (OP 2 and OP 3) containing 25 nests each were established at Observation Point. On the first observation day, 10 eggs were counted at OP 2 and 5 eggs at OP 3. The first chicks were observed on June 25 at each plot and the maximum chick counts were 14 at OP 2 and 18 at OP 3 (Table 4). Observers recorded only two surviving chicks during the season's last count on August 12: one in OP 2 and one in OP 3. The low survival chick rate may be due to the predation of ravens. A raven's nest, containing two adults and two chicks was located near the study plots and staff observed ravens taking seabird chicks throughout the summer. It was also noted by staff that two chicks were dead after a severe storm.

Common murre productivity monitoring for the 2005 field season was conducted from June 6 through August 12. Two plots containing 25 nests each were established at Observation Point: OP 2 and OP 4. On June 8, four eggs were first observed at OP 2 and on June 8, 16 eggs were observed on OP 4. Since it is difficult to see actual chicks, brooding behavior suggested that first chicks arrived on July 22 and maximum chick count was 4 at OP 2 (20 if

brooding behavior is counted as one chick/brooding adult) on August 12, and 7 chicks at OP 4 (17 if brooding behavior is counted as one chick/brooding adult) on August 10 (Table 4). Staff observed the unusual behavior of adult COMUs standing with disinterest near their freshly laid eggs (4 eggs) on OP 2, June 21. On August 10, five COMU fledglings were on the water near Boat Cove.

Ten total population counts of the five plots from Observation Point were conducted for five seabird species. The focal species included; PECO, BLKI, COMU, HOPU and TUPU. The population counts began at the observation of the first egg (early June) and counts were duplicated every third day (APP. F). One chick count was conducted for PECO, BLKI, and COMU at the same location on August 7 (Table 5). Chick counts are not completed for HOPU or TUPU because they nest in burrows and chicks are not visible to observers.

The seabird population and productivity monitoring data were given to USF&WS migratory bird management and USGS for inclusion in their statewide seabird-monitoring program.

OTHER OBSERVATIONS/PROJECTS

TRAIL IMPROVEMENTS AND ADDITIONS

The trail improvements and additions involved the following: building a stairway from Boat Cove to the main trail system; boardwalk additions and improvements; the addition of Geoblock™ panels; and trail additions, maintenance, and rerouting.

STAIRWAY

Lubchem of Alaska Inc was the material supplier for the stairway project. SAFRAIL™, a fiberglass handrail and ladder system made by Strongwell, was chosen because of its ease of assembly, light weight, streamlined appearance, and its cost effectiveness. This product meets federal OSHA standards and complies with international standards.

Three hundred and six volunteer hours were dedicated to building the stairway from Boat Cove, up the steepest part of the rock face, and to the main trail system. The stairway has a vertical gain of 27 feet and has a handrail on one side. It is comprised of a lower, middle, and upper level and is separated by two, 36 x 36 inch landings.

BOARDWALK ADDITIONS AND IMPROVEMENTS

Twenty-five, twelve foot long, 2 x 6 inch, composite boards were used to build additional boardwalk trails. Sixty linear feet of boardwalk trail were built in this manner above Boat Cove and 90 linear feet were built between First and Second Beach. To provide traction on the old wooden boardwalk, 300 linear feet of hardware cloth, a metal mesh, were stapled to existing boardwalks. Two hundred and fifty feet of boardwalk were stapled between First and Second Beach and 50 feet of boardwalk between Boat Cove and Flat Rock.

GEOBLOCK™ PANELS

Geoblock™ panels are a series of interlocking, high-strength, recycled plastic material,

designed to reduce erosion. They provide load support by dispersing the weight over a larger area while allowing for the growth of vegetation through the panels. The panels also aid walkers when the trail is slippery. Approximately 120 linear feet of panels were installed between First and Second Beach. Eight steps were built with this material at North Boat Cove and four were built near Flat Rock.

TRAIL ADDITIONS, MAINTENANCE, AND REROUTING

The trail additions for the project included an approximate 300-foot extension at East Cape (the location of the Steller sea lion haulout). As a safety measure, the western third of traverse trail leading to West Main Beach, and the trail above Campground Beach were rerouted to keep staff and visitors further from a steep cliff face. A trail leading from the island access site to the cabin was rerouted to bypass an archeological site, as recommended by the National Park Service.

CABIN IMPROVEMENTS

Four major improvements to the cabin were accomplished during the 2005 field season. One improvement, the replacement or the renovating of two floor joints was made directly to the cabin and three improvements were made to its facilities.

The original 50 gal steel oil tank was replaced with a new 15 gal plastic drum. The new drum contains a Goldenrod block fuel filter, which will help to eliminate problems such as rust and water heating fuel contamination. A fuel drum enclosure was built and lined with an impermeable material to protect the tank from the elements and to contain spills. Three 12-V batteries were moved from the inside to the outside of the cabin and placed in a protective box. An ATC fuse panel was installed to plug in the various electrical devices to protect each electrical unit with a fuse.

REMOTE INTERNET VIDEO CAMERA

The Round Island SeeMore Wildlife System (SWS) camera system is comprised of two cameras: one at first beach and one at Main Beach. The First Beach camera is connected to the base site with a 700-foot cable. To view Main Beach, approximately one half mile away, the video signal must be transmitted to the base site by utilizing a microwave transmitter powered by a pair of 85-watt solar panels. The microwave transmitter allows the user to switch from the First Beach camera to the distant Main Beach camera. The entire system is powered remotely by six solar panels and two wind generators, which charge four deep-cycle batteries. The base station transmits images through a satellite uplink that passes up to 256kps of data to the Internet. This system enables any user with the SWS soft ware and the proper passwords to access the site remotely and to control the camera.

SeeMore employees arrived on Round Island on May 20 and had the first live video delivered on May 24th. The camera system ran live video consistently until late-June, until a problem developed with the Main Beach camera. A repair trip to correct the problem was made and the camera was working until late August when the satellite system stopped

transmitting video.

The Alaska Sealife Center (ASLC) displayed the live images at two sites. One was a sit-down style computer kiosk and a 4 X 5 foot graphic panel, which explains basic walrus natural history as well as how the camera system works. Approximately 140,000 people visited the exhibit during the summer of 2005. The second outlet was through the ASLC website where 100,000 hits for the Round Island live video feed website occurred. The system crashed when the public response to the site became overwhelming. During the times when the system was running the exhibit at the ASLC was attended approximately 90% of the time. The delay between when the visitors moved the remote camera controls and when the cameras responded was between one half to four minutes long. This became a problem when visitors, not knowing of the delay, became impatient and pressed the controls repeatedly (pers. comm. Steve Carrick, Manager of Exhibits and Interpretive Services for ASLC). With a quicker response time of the remote camera and a more reliable Internet site the camera system at Round Island has tremendous potential as an educational tool to the public. The system's performance is expected to improve in its second year as software advances in video compression technology increases the quality of the video stream to the public.

SEA LION CAMERA

The sea lion haulout digital camera took a photo every fifteen minutes of the haulout site. The camera was in operation from May 29 to August 13. The results of this project went to ADF&G Marine Mammal Division.

IVORY COLLECTION

There were 13 tusks taken from Round Island carcasses during the field season of 2005. Seven of the tusks were delivered to Jim Woolington (ADF&G Dillingham biologist) and six were delivered to Joel Garlich-Miller (USF&WS Marine Mammal Management biologist).

EXOTIC SPECIES

Dandelions, most likely of the species *Taraxacum officinale*, were noted during the summer field season of 2004 along the trail leading to Traverse Trail. Visitors frequent this trail and seeds of this plant probably came in on their footwear or clothing. Mary Cody of USF&WS had not seen dandelions on the island during the previous five summers that she monitored it. When the dandelions were observed in 2004, staff members dug out the dandelions and burned them in a burn barrel located near camp. Although as much of the root system as possible was taken, and the dandelions were destroyed by fire before going to seed, they were once again recorded on Round Island during 2005. In 1996 only two non-native species were recorded: Pineapple Weed (*Matricaria matricoides*) and Kentucky Bluegrass (*Poa praetensis*; Hesselback and Neitlich).

SUBSISTENCE HUNT

In 1995, a hunt managed through a cooperative agreement included; ADF&G, FWS, Eskimo

Walrus Commission, and the Qayassiq Walrus Commission (QWC). The traditional hunt allowed Bristol Bay area natives to take up to 20 walruses on Round Island. Four walruses were taken during the hunting season of 2005: three from Dillingham and one from Togiak.

RECOMMENDATIONS

- 1) Continue to follow walrus count protocols initiated in 1998 and revised in 2002. Continue daily counts of walruses on West Main Beach. Research remote sensing technologies that would allow daily counts of West Main and Southwest Main Beaches, as well as provide a better view of Main Beach.
- 2) Use ground photographs and walrus count data to generate a correction factor for each observer.
- 3) Work cooperatively with other agencies to broaden the scope of Round Island research and better monitor the entire ecosystem.
- 4) Continue to protect walruses and other wildlife within the sanctuary, while providing an opportunity for scientific study and enjoyment of the sanctuary.
- 5) Continue to run and improve upon the remote video camera system on Round Island to provide educational opportunities, public enjoyment, and research and management topics.
- 6) Replace the existing cabin that is rotting due to water damage.
- 7) Monitor and destroy dandelions in an effort to keep them from spreading.

ACKNOWLEDGEMENTS

Thanks goes out to the seven volunteers that helped to make this a successful field season. Special thanks to Brian Okonek who spent most of his summer volunteering on Round Island. Mary Cody (FWS), Helen Chythlook (BBNA), Joe Meehan (ADF&G), Jim Woolington (ADF&G), Steve Carrick (ASLC), and Todd Erickson (SWS) answered many questions thoroughly and promptly. The Department of Natural Resources, Division of Parks and Outdoor Recreation, and the National Park Service, National Natural Landmark Program funded the trails project. Seven Volunteers: Brian Okonek, Betty Menard, Sandy Kogl, Bill Gossweiler, Deb Brocke, and Jeff Robinson dedicated hundreds of hours to the project. Judy Alderson (NPS) is acknowledged for her continued interest and support in the management of the walrus Islands. Ray Schoendaller and Fred Fox (LUBCHEM of Alaska) and Larry Aumiller (ADF&G) contributed to the design of the stairway. Staff at the ADF&G office and Togiak National Wildlife Refuge provided logistical support for this project.

LITERATURE CITED

- Cody, M. 2003. Round Island Field Report: May 13-August 12, 2000. USFWS rept., Marine Mammals Management. Anchorage, AK.
- Fay, F. H. 1982. Ecology and biology of the Pacific walrus, *Odobenus rosmarus Divergens* Illiger. USFWS. N. American Fauna No. 74, Washington, D.C. 279pp.
- Helfrich, M. and J. Meehan. 2004. Walrus Ilands State Game Sanctuary Annual Report. ADF&G rept. Anchorage, AK.
- Hasselbach L. and Neitlich P. 1996. A Description of the Vegetation of Round Island, Walrus Islands State Game Sanctuary, Alaska. ADF&G rept. Anchorage, AK.
- Koenen, K. and S. Rice. 1996. Walrus Islands State Game Sanctuary Annual Report. ADF&G rept. Anchorage, AK.
- Kruse, S. and C. Jack, 1998, Bristol Bay Walrus Houlout Monitoring Program; Cape Seniavin, AK. Summer 1998. USF&WS rept. Anchorage AK>
- Raymond, R. 1998. Walrus Islands State Game Sanctuary Annual Report. ADF&G rept. Anchorage, AK.
- Rice, S. 2002. Walrus Islands State Game Sanctuary Annual report. ADF&G rept. Anchorage, AK.
- Salter, R.E. 1979. Site Utilization, activity budgets and disturbance responses of Atlantic walruses during terrestrial haulout. Canadian Journal of Zoology. 57 (6):
- Snively, M. L. 2003. Bristol Bay Walrus Haulout Monitoring Program; Cape Seniavin. Annual Report, USF&WS rept. Anchorage AK.

FIGURES

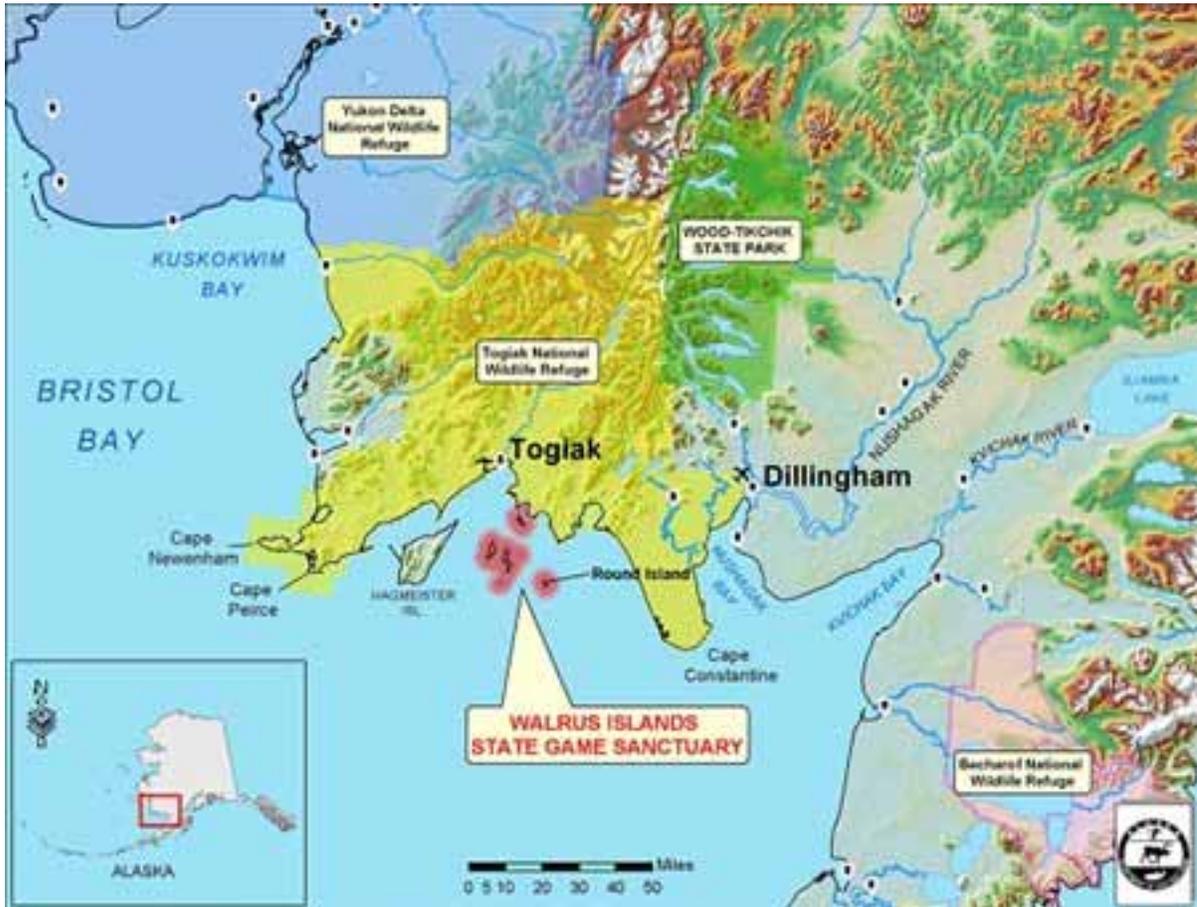


Figure 1. Map of northern Bristol Bay showing the location of Round Island and the Walrus Islands State Game Sanctuary.

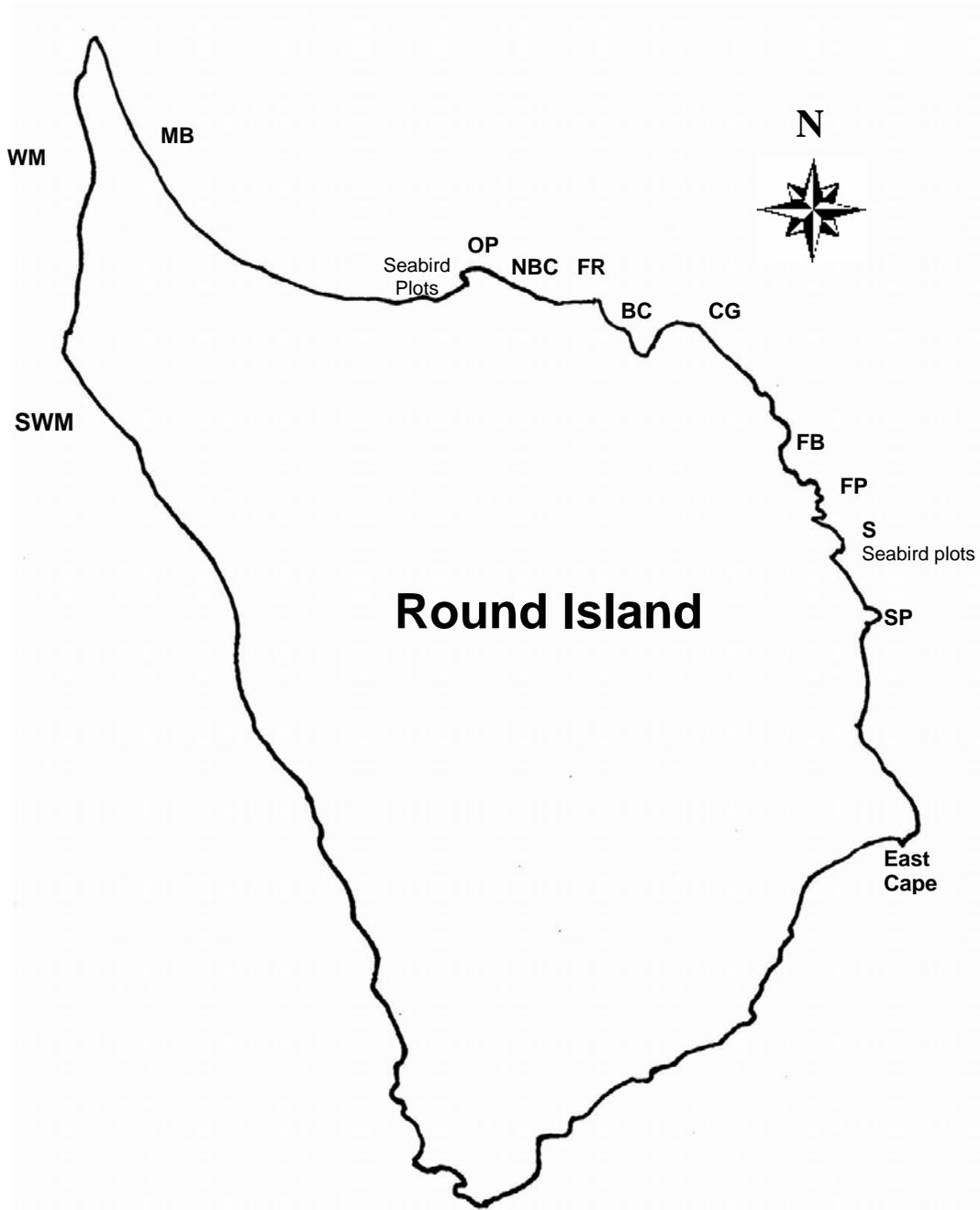


Figure 2. Map of Round Island with locations of walrus haulout beaches, bird plots and sea lion site; East Cape (sea lion haulout), SP (Second Prime), SB (Second Beach), FP (First Prime), FB (First Beach), CG (Camp Ground), BC (Boat Cove), NBC (North Boat Cove), OP (Observation Point, MB (Main Beach), and WM (West Main Beach), South West Main, (SWM).

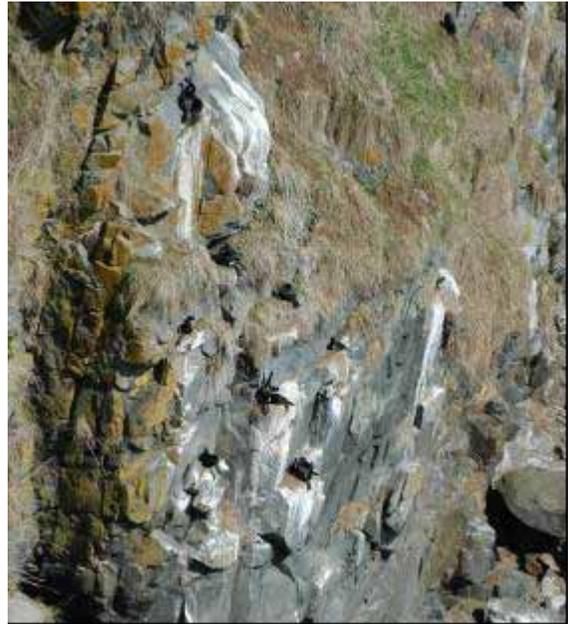


Figure 3. Pelagic cormorant productivity plots at Second Beach, Round Island 2005.

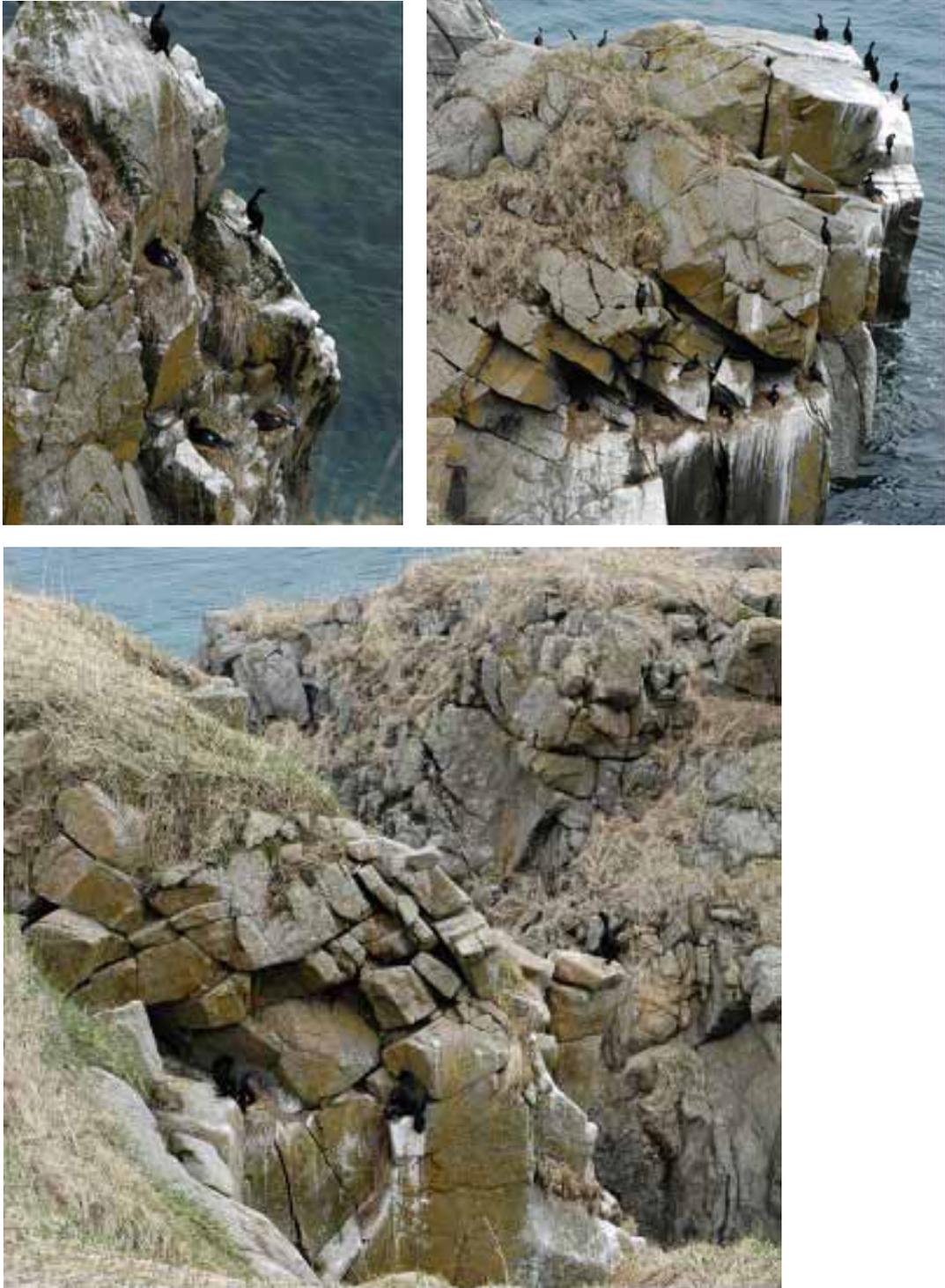


Figure 4. Pelagic Cormorant productivity plots at Second Prime Beach, Round Island 2005.

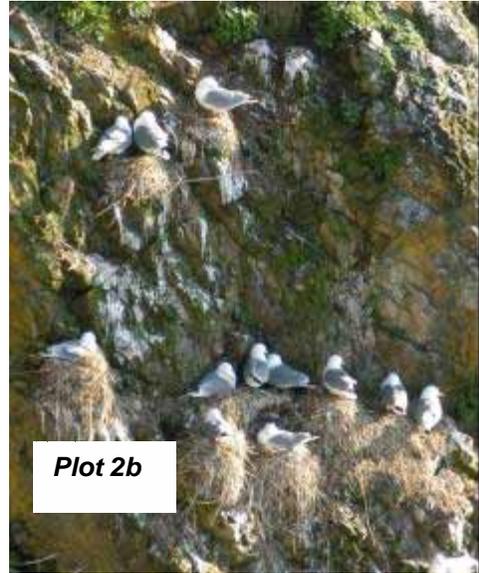


Figure 5. Black-legged kittiwake productivity plots at Observation Point, Round Island 2005.

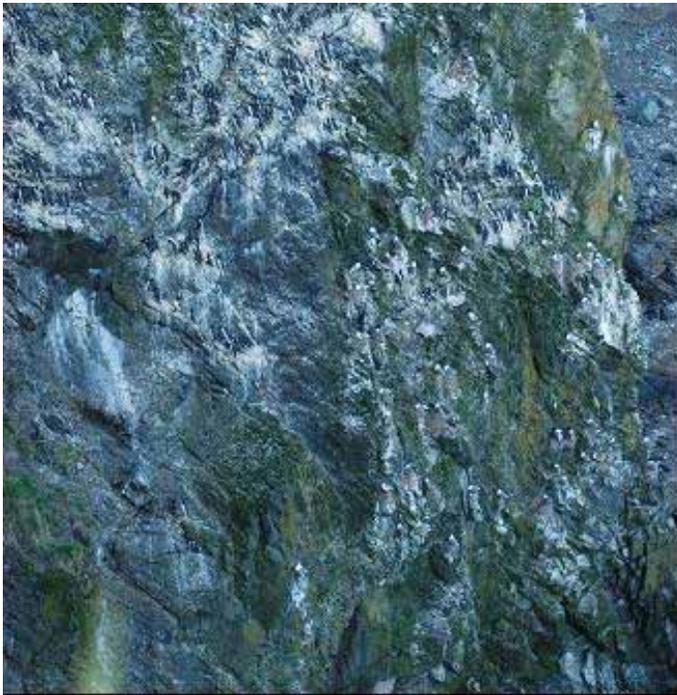


Figure 6. Common Murre productivity plots at Observation Point on Round Island, 2005.

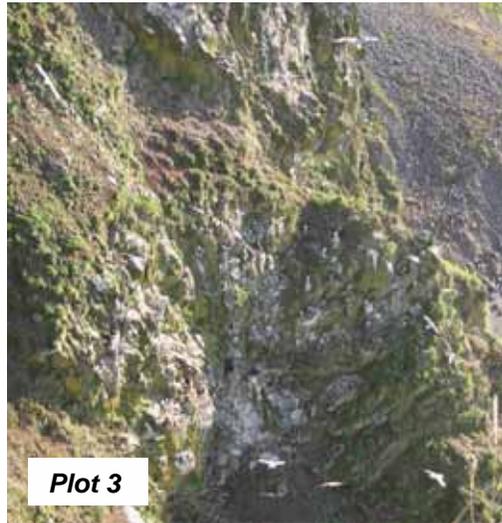


Figure 7. Seabird productivity plots at Observation Point for total population counts of five species of seabirds; pelagic cormorants, black-legged kittiwakes, common murre, and horned and tufted puffins; Round Island 2005.



Figure 8. Sea lion haulout camera and view of haulout at East Cape, Round Island 2005.



Figure 9. SeeMore satellite video camera and crewmember at Observation Point, Round Island 2005.

**Visitors to Round Island, Walrus Islands
State Game Sanctuary 1975-2005**

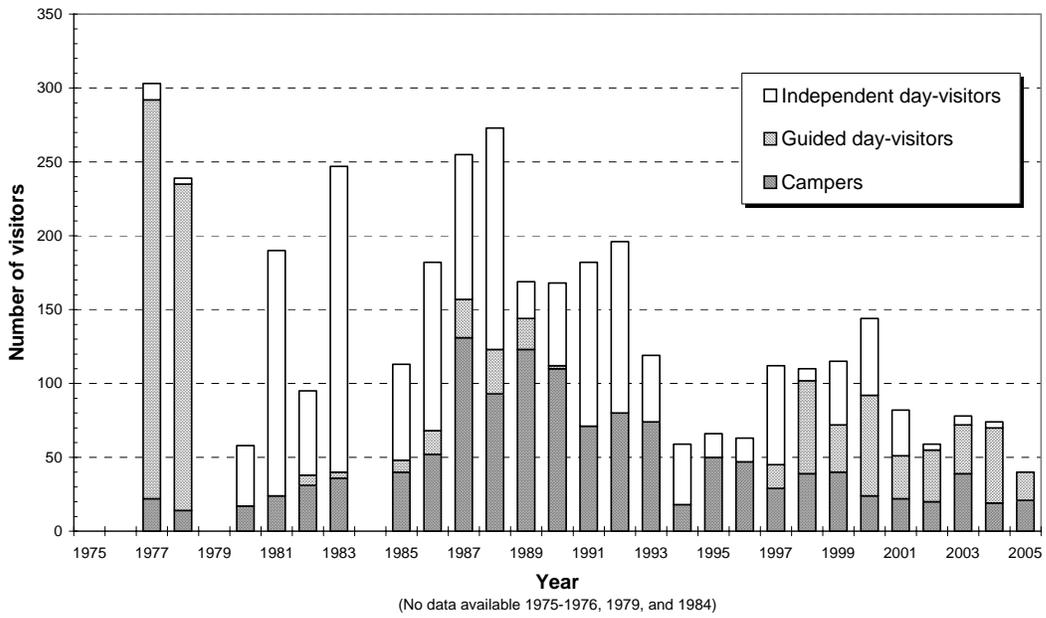


Figure 10. Visitor numbers, Round Island 1977-2005.



Figure 11. Disturbance caused by highflying jets, Round Island 2005.



Figure 12. Fresh carcass, with massive bruising, found after a serious disturbance caused by a thunderstorm, Round Island 2005.

**Peak Walrus Counts, Round Island,
Walrus Islands State Game Sanctuary 1972-2005**

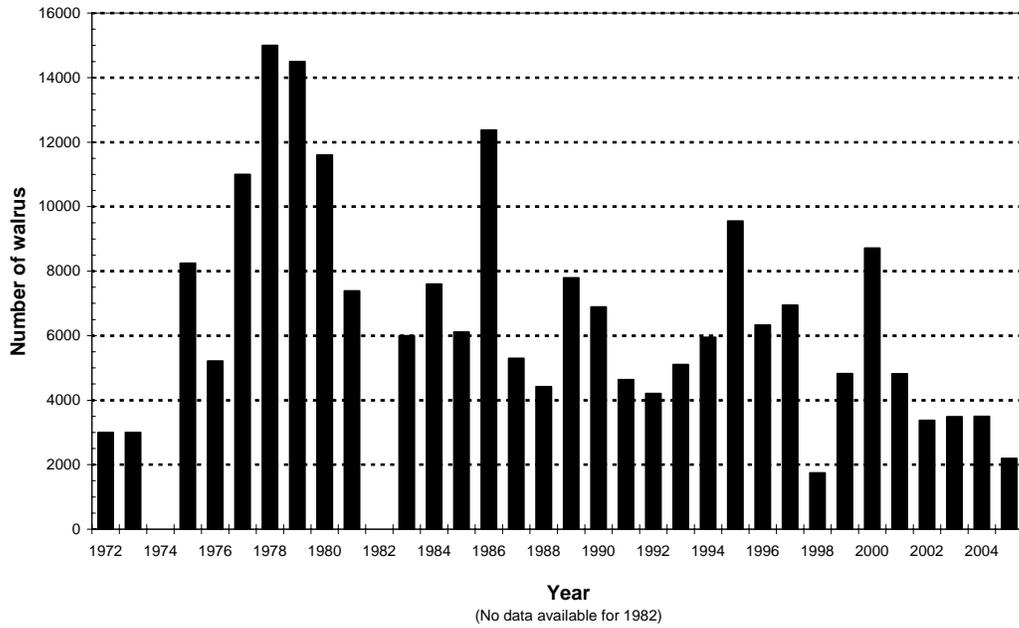


Figure 13. Peak walrus counts, Round Island 1972-2005.



Figure 14. Stairway leading from Boat Cove up the rock face to the main trail system, Round Island 2005.



Figure 15. Hardware cloth covering boardwalk (a), and geo blocks (b), were some of the trail improvements to add safety and decrease erosion, Round Island 2005.



Figure 16. Cabin floor with mold and wood rot, located in the back room of the Round Island cabin.

TABLES

Table 1. Visitation to Round Island for ten years preceding 2005.

Year	Campers	Guided day- visitors	Independent day-visitors	Total
1995	50	0	16	66
1996	47	0	16	63
1997	29	16	67	112
1998	39	63	8	110
1999	40	32	43	115
2000	24	68	52	144
2001	22	29	31	82
2002	20	35	4	59
2003	39	33	6	78
2004	19	51	4	74
			Total	903
2005	21	19	0	40

Table 2. Country/state of origin of visitors, Round Island 2005.

Origin	Campers	Guided day- visitors
United States:	16	
Alaska	12	
<i>Anchorage</i>	(6)	
<i>Cordova</i>	(1)	
<i>Girdwood</i>	(2)	
<i>Juneau</i>	(1)	
<i>Ketchikan</i>	(1)	
<i>Valdez</i>	(1)	
California	1	
Montana		1
New York		1
Ohio	1	
Oklahoma		2
Pennsylvania		2
Vermont		1
Washington	2	
West Virginia		1
Other Countries:		
Germany		2
Italy	2	
London		2
South Africa	1	
Spain	2	
Switzerland		4
Miscellaneous:		
Alaska Guides		3
Total:	21	19

Table 3. Walrus response to anthropogenic and natural stimuli, Round Island 2005.

Animal Response	Anthropogenic Stimulus	Natural Stimulus	Unknown Stimulus
Head Raises	9		
Orienting	1		
Dispersal	6	1	1
Animal Reacted but Response is unknown	1		
Total response in relation to stimulus	17	1	1
No Reaction	19		
Walrus Not Observed	1		
No Walrus Present at observed beaches	10		

Table 4. Productivity of three indicator seabird species; pelagic cormorant, black-legged kittiwakes, and common murre; Round Island 2005.

Species	Plot	Total # nests	Date first egg/s obs (#)	Date first chick/s obs (#)	Max chick count and date	Total days monitored
PECO	SP	12	May 20 (21)	June 20 (1)	July 19 (36)	42
PECO	SB	21	May 22 (2)	June 25 (6)	July 25 (37)	42
BLKI	OP (2)	25	June 4 (10)	July 2 (11)	June 14 (14)	33
BLKI	OP (3)	25	June 4 (5)	July 2 (2)	June 3 (18)	33
COMU	OP (2)	25	June 8 (1)	July 22	*August 12 (18)	32
COMU	OP (3)	25	June 16 (1+)	July 22	**August 10 (17)	32

Table 5. Chick count for five seabird species; pelagic cormorant, black-legged kittiwake, common murre, and horned and tufted puffin; conducted on August 8 at Observation Point, Round Island 2005.

Species	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
PECO	0,0	14,14	10,10	0,0	0,0
BLKI	0,0	3,3	4,4	0,0	2,2
COMU	30,30	45,50	15,16	12,13	68,75

APPENDICES

Appendix A. Data collection protocols for Bristol Bay walrus monitoring, Round Island 2005.

DAYLOG Information - recorded on the upper half of the field data sheet (one data sheet for each day).

Log ID: Concatenation of location code and the date in *yymmdd* format. For example, a data sheet from Round Island on May 10, 1997 would be entered as RI970510.

Location General location of haulout counts.

CP = Cape Peirce

CN = Cape Newenham

CS = Cape Seniavin

RI = Round Island

OT = Other

Date Date in *mm/dd/yy* format

Time Time in *hh:mm* (24 hr) format. Record at the start of environmental data collection at designated weather observation site.

Cloud Cover A qualitative description of the visible sky. Recorded at the designated weather observation site.

C = Clear 0/8 (amount of sky obscured - no clouds or haze)

F = Few 1/8-2/8

S = Scattered 3/8-4/8

B = Broken 5/8-7/8

O = Overcast 8/8

Wind Speed The wind speed reported at the designated weather observation site (km/hr). Record the estimated average reading after watching changes in the anemometer for 60-90 seconds.

Wind Direction Compass direction of prevailing wind measured at camp's weather station. Measured at the weather observation site.

N = North

S = South

E = East

W = West

NE = Northeast

SE = Southeast

NW = Northwest

Appendix A. Continued.

SW = Southwest

V = Variable

NO = No wind detectable

Precipitation Any precipitation, such as rain, sleet, snow, or fog. Recorded at weather observation site. Usually, conditions are very dynamic, so record weather encountered while you were collecting the above weather information.

N = No precipitation occurred during your weather evaluation

R = Rain

F = Fog

S = Snow

RF = Rain and fog

SL = Sleet

Barometer AM Barometer reading at about 08:00 (mmHg).

Barometer PM Barometer reading at about 20:00 (mmHg).

Tide Tidal stage. Record just before leaving camp to begin counts. Each location has different methods for determining tidal stage. If your location relies on a published tide table, look up the day's record and if necessary, extrapolate tide stage according to corrections provided in the tide book for time zone and area.

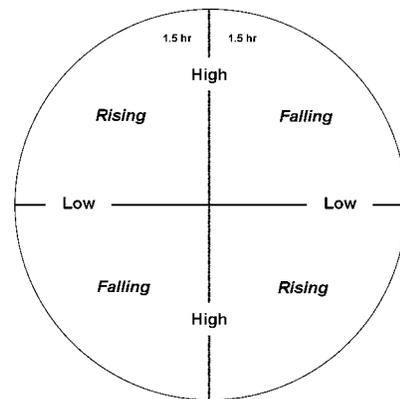
Tide stages are defined by breakpoints 1.5 hours before and after high and low tides.

H = High

L = Low

R = Rising

F = Falling.



Appendix A. Continued

Max Temp Maximum temperature (degrees Fahrenheit) over the last 24 hrs as read from a minimum-maximum thermometer. Record when you take the pm barometer reading.

Min Temp Minimum temperature (degrees Fahrenheit) over the last 24 hrs as read from a minimum-maximum thermometer. Record when you take the pm barometer reading. *Remember to reset the thermometer after you record the temperature data.*

Comments Record comments at any time. This is a narrative pertaining to walrus observations, problems with methodology, or needed changes. If comments are extensive, continue on the back of the field data sheet.

COUNT Information - recorded in the table on the lower half of the field data sheet (one beach count per line). In general, environmental information for the count should be recorded before counting.

Beach Code for the beach being counted (Table 1). Additional beach codes can be added to the database.

Start Time Time the count begins in *hh:mm* (24 hr) format.

End Time Time the count ends in *hh:mm* (24 hr) format.

Method The method used for counting the beach. Record appropriate code before counting.

S = Scheduled ground count. A count scheduled on the basis of time of day. (The daily count described in the count methodology)

I = Interval count. Regularly scheduled, repeated counts of beaches used to assess diurnal variability of walrus on beaches.

C = Correlation count. Scheduled counts of West Main beach (Round Island) to determine relationship between use of Main beach and West Main.

O = Opportunistic ground count. An unscheduled count which occurred because you were just walking by or were doing something else (as opposed to counting this beach as part of a regularly scheduled count).

T = Tide ground count. A count scheduled to correspond with particular tide stage.

Appendix A. Continued.

Observer	Initials of person making the count.
Beaufort	Beaufort sea state (Table 2) of offshore waters, away from Sea State land effects. Identify an area which is not in a wind shadow or otherwise immediately influenced by land. This is important because islands and shore topography can have major effects on perceived water conditions.
Beach	An assessment of amount of beach available to walrus for
Visibility	A qualitative assessment of the visibility of the haulout you are counting. Record before counting. C = Clear. No obstructions (physical: i.e. rocks, sand dunes, etc; weather; or sun glare) which impede your ability to clearly see all of the haulout. P = Partially obscured. Fog blows in and out during the count, partially obscuring some of the haulout all of the time. The sun glare might be bad, but you can still squint hard and make a count. O = Obscured. Bad weather or sun glare can make it impossible to count a beach. If you linger for a time and conditions don't change- you probably can't get a decent count, so enter this qualifier.
Land	The number of walrus on a particular beach. Animals must be on exposed beach or standing in surf zone.
Water	All walrus in the water and within 10m of the shoreline. Count once.
Count Quality	Subjective rating of count quality. If counts are scored fair or poor, explain the situation leading to this assessment in the comments section.

E = Excellent

G = Good

F = Fair

P = Poor

Appendix A. Continued.

Description of Beaufort Sea State

<i>Beaufort Number</i> <i>r</i>	<i>Wind Speed</i>			<i>Meteorological Description</i>	<i>Effects Observed at Sea</i>
	<i>Knots</i>	<i>mph</i>	<i>km/hr</i>		
0	<1	<1	<1	Calm	Sea like a mirror
1	1-3	1-3	1-5	Light Air	Ripples with appearance of scales; no foam crests
2	4-6	4-7	6-11	Light Breeze	Small wavelets; crests of glassy appearance, not breaking
3	7-10	8-12	12-19	Gentle Breeze	Large wavelets; crests begin to break, scattered whitecaps
4	11-16	13-18	20-28	Moderate Breeze	Small wave 0.5-1.25 meters high, becoming longer; numerous whitecaps
5	17-21	19-24	29-38	Fresh Breeze	Moderate waves of 1.25-2.5 meters taking longer to form; many whitecaps; some spray
6	22-27	25-31	39-49	Strong Breeze	Larger waves 2.5-4 meters forming; whitecaps everywhere; more spray
7	28-33	32-38	50-61	Near Gale	Sea heaps up, waves 4-6 meters; white foam from breaking waves begins to be blown in streaks

Appendix B. Walrus count protocols for Bristol Bay walrus haulout monitoring program, Round Island 2005.

Follow these protocols every day. If a situation arises and you cannot follow standard protocols, document (in detail) how and why you changed protocols in the comments section of the count data form.

We are asking for an increase in observer effort this year so we can collect information to answer some basic questions of haulout use and herd movement patterns. This information will help to refine the methodology for the Bristol Bay haulout index and monitoring program and will provide important information on widespread movement patterns (useful in understanding the dynamics of the Bristol Bay complex and will help in the design of the next range-wide population survey).

1. Counting Methodology

Individually count walrus hauled out on each beach or estimate their numbers using binoculars, tally meter, pencil, and notebook. Count the number of walrus in the water (within 10m of shore) at each beach and record the number separately from the beach count.

Tally meters are notorious for short functional (accurate) lives, and quickly become great sources of variability and inaccuracy in counting. Every day or 2, check your tally meter by counting to 100-200 and checking what the tally reads, repeat this once or twice to determine if the tally is working properly. Replace the tally meter as soon as the it begins malfunctioning.

Counting technique will vary with group size counted. The following guidelines are suggested. In general, count individuals in groups of up to 200 animals. The maximum number of walrus that can be counted individually will vary with observer experience, beach location, survey conditions, etc. For example: on haulouts with distinctive landmarks such as boulders, larger numbers of walrus can be individually counted. To count these groups, divide the beach into sections, using landmarks as reference points. Count walrus in each section, and add these sections for a total count. Otherwise, in groups >200 individuals, estimate walrus numbers. To estimate numbers in larger groups, count the number of animals in a manageable, representative subsection of the group.

Appendix B. Continued.

2. Daily Counts

- I. **Round Island, Cape Peirce, Cape Seniavin:** Start by recording the AM barometer reading at 0800. Begin counts at 1400 hrs. Establish a routine where you count the beaches in the same order each day. Describe any changes to your normal routine in the comments section of the count data form.

- II. **Cape Newenham:** Collect the AM barometer reading at 0800. Time your hikes to arrive at the haulout as close to 1400 hrs as possible.

Interval counts will begin at 0900 hrs, 1400 hrs, and 1900 hrs. Dates of interval counts are determined prior to field season start.

Disregard any dates you are not in the field. Continue the pattern if you are in the field longer than the listed schedule. If there is a conflict between a scheduled interval count and another unavoidable activity (Round Island boat visit, etc), continue normal protocols (multiple observers, independent counts) to count as many of the intervals as possible. During periods of interruption, attempt to have one observer keep to the schedule to prevent interruptions of the intervals. Note any changes to standard protocols in the comments section of the count data form.

Appendix C. Anthropogenic activities and natural occurrences, Round Island 2005.

Date 2005	Start Time	End Time	Stimulus Audio(A), Visual (V)	Closest Appr/Wind Dir	# of Walrus	Response	Brief Description
15-May	12:40	19:00	A,V	0.5 mi/no wind	400 at 17:00	unk	Helicopter brought staff and slings 22 loads of gear ashore from boat, 13 to cabin and 9 to BC.
17-May	12:12	12:40	A,V	150m/NE	1-FR, 1BC	NR	Boat brought 3 visitors to the bay at BC, but did not come to shore
24-May	15:30	15:50	A	10km/S	14 FB	4 hr, 1or	SeeMore crew drilled two holes in rock 5 ft below view point.
30-May	10:30	11:00	N/A	N/A	0	N/A	Two SeeMore crew members brought to R.I. By boat.
8-Jun	11:00	11:20	V	40 ft	3	MB-3 DS	MB had 3 walruses, staff retrieved ivory. 2 ds before arrival and 1 as staff approached a mort. Boat was beached 200m E of walruses and out of their view.
9-Jun	20:00	20:30	A	3mi	80 MB	NR	Large ship (app. 50 m) passed between RI and Summit Is. While staff was counting at WM. It was difficult to tell whether it was w/in 3 miles so staff tried to hail them upon return to the cabin.
11-Jun	8:40	9:15	V,A	3mi	50 FB	NR	The above ship returned and was contacted and they responded that they were beyond the 3 mi limit.
23-Jun	19:00	20:00	V,A	400 m	9-CG,10-FR,30-BC	1animal responded	Five volunteers and 1 visitor arrived from the Inconnu, which; due to calm waters, anchored well offshore. CG was used because there were walruses at BC. (photo avail)
25-Jun	10:25	11:00	V,A	200m	1-CG,4-FR	1-CG DS	Inconnu arrives with 4 visitors and departs with 1.
25-Jun	16:00	16:30	V,A	400 m	0	NR	Inconnu arrives with 1 camper
26-Jun	10:20	19:39	V,A	400 m	4-CG,1-BC, 10-FR	NR	Inconnu arrives with 2 campers.
27-Jun	16:20	16:45	V,A	400 m	3-CG,2-FR	NR	Inconnu arrives with 2 day visitors.
27-Jun	18:00	18:30	V,A	400 m	4-CG	NR	Inconnu departs with 2 day visitors.
28-Jun	10:20	18:45	V,A	300 m	4-CG, 7-FR	NR	Inconnu arrives with 2 day visitors
28-Jun	10:20	18:45	V,A	300 m	3-FR	NR	Inconnu departs with 2 day visitors and 2 campers.
28-Jun	19:00	21:00	A	N/A	16-FB, 4-BC, 300-MB	16-FB DS, 4-FR DS, 100s-MB HR	DS at FB observed during a thunderstorm. Hundreds of HR at MB.
30-Jun	8:15	9:14	V,A	100 m	0	N/A	Inconnu departs with 4 visitors. Two fresh morts, 1 at FB and 1 at MB.
1-Jul	6:45	15:00	N/A	N/A	0	N/A	USCG searches area but did not approach R.I.
1-Jul	8:00	8:30	N/A	N/A	0	N/A	Inconnu departs with 3 volunteers and 1 visitor.
1-Jul	18:26	19:25	N/A	N/A	0	N/A	Inconnu arrives with 1 volunteer and 4 campers.
2-Jul	17:35	17:40	A	app. 30,000ft	91-FB, 83-SB	51-FB DS,40-FB HR, MB NR, 83-SB DS	Aircraft (3) at app. 30,000 ft flew over R.I. from E-W. At least 41 walruses were observed to DS at FB by staff. Visitors obs. walruses in water at SB. No DS at MB were obs. by staff. 60-70 walrus swimming from CG towards MB at 17:45. (photos avail)
4-Jul	7:45	8:43	V,A	300 m	11-FR, 42-BC,11-CG	2-FR HR,5-BC-HR	Inconnu departs with 2 campers.
6-Jul	7:28	8:29	V,A	200 m	4-FR, 10-BC, 1-CG	1-FR HR, 2-BC HR	Inconnu departs with 2 staff and 2 visitors.
8-Jul	12:09	19:32	V,A	200m/W (4 kt)	1-FR	1-FR HR	Inconnu arrives with 4 day visitors.

Appendix D. Walrus counts, Round Island 2005.

Date	East Side Totals	West Side Totals	Total Number of Walrus	Method
5/17/2005	619	201	820	standard
5/18/2005	1692	426	2118	standard
5/19/2005	1705	490	2195 (max ct)	standard
5/20/2005	1307	no count	1307	standard
5/21/2005	498	135	633	standard
5/23/2005	447	58	952	standard
5/24/2005	464	26	490	standard
5/25/2005	412	19	431	standard
5/26/2005	372	336	708	standard
5/28/2005	210	no count	210	standard
5/29/2005	280	no count	280	standard
5/30/2005	3	490	493	standard
5/31/2005	622	499	1121	standard
6/1/2005	342	490	832	standard
6/2/2005	277	no count	277	oppurtunistic
6/3/2005	400	*675	1075	boat
6/4/2005	294	no count	294	oppurtunistic
6/5/2005	407	280	687	standard
6/6/2005	145	465	610	standard
6/7/2005	7	155	162	standard
6/8/2005	0	390	390	standard
6/9/2005	109	552	661	standard
6/10/2005	695	446	1141	standard
6/11/2005	702	346	1048	oppurtunistic
6/12/2005	226	349	575	oppurtunistic
6/13/2005	1168	314	1482	standard
6/14/2005	407	62	469	standard
6/15/2005	369	0	369	oppurtunistic
6/16/2005	425	0	425	oppurtunistic
6/17/2005	100	no count	100	standard
6/18/2005	193	155	348	standard
6/19/2005	227	33	260	standard
6/20/2005	300	14	314	standard
6/21/2005	580	239	819	oppurtunistic
6/22/2005	339	560 (max ct)	899	standard
6/23/2005	995	472	1467	standard
6/24/2005	771	460	1231	standard
6/25/2005	313	430	743	standard
6/26/2005	467	139	606	oppurtunistic
6/27/2005	98	153	251	oppurtunistic
6/28/2005	406	66	472	standard
6/29/2005	156	no count	156	standard
6/30/2005	131	0	131	standard

Appendix D. Continued.

Date	East Side Totals	West Side Totals	Total Number of Walrus	Method
7/1/2005	223	0	223	standard
7/2/2005	395	0	395	standard
7/4/2005	1528	425	1953	standard
7/5/2005	1268	365	1633	oppurtunistic
7/6/2005	1297	126	1423	standard
7/7/2005	330	1	331	standard
7/8/2005	212	0	212	standard
7/9/2005	214	0	214	standard
7/10/2005	48	no count	48	oppurtunistic
7/11/2005	138	no count	138	oppurtunistic
7/12/2005	483	0	483	standard
7/13/2005	376	no count	376	oppurtunistic
7/14/2005	1004	152	1156	standard
7/15/2005	991	212	1203	standard
7/16/2005	801	154	955	standard
7/17/2005	416	no count	416	standard
7/18/2005	149	no count	149	oppurtunistic
7/19/2005	124	0	124 (min ct)	standard
7/20/2005	185	no count	185	standard
7/21/2005	225	0	225	standard
7/22/2005	300	no count	300	standard
7/23/2005	736	119	855	standard
7/25/2005	211	430	641	standard
7/28/2005	270	208	478	standard
7/29/2005	203	47	250	standard
7/30/2005	286	0	286	standard
7/31/2005	556	0	556	standard
8/1/2005	659	0	659	standard
8/2/2005	824	221	1045	standard
8/3/2005	355	no count	355	standard
8/5/2005	360	no count	360	standard
8/6/2005	512	0	512	standard
8/7/2005	376	no count	376	oppurtunistic
8/8/2005	626	0	626	standard
8/9/2005	593	0	593	standard
8/10/2005	271	0	271	standard
8/13/2005	341	0	341	standard
Averages	470	198	630	

Appendix E. Steller sea lion counts, identifications, and comments. Round Island 2005.

Date 2005	Land Count (ave 2 cts)	Water Count (ave 2 cts)	Total	Brands/Tags	Comments	Observer
7/5	62	3	65	A255, A151, A256, A281, one suckling behavior	one suckling behavior	DCO
7/7	100	0	100	F1135, A278, X3, A5, A228	F1135: possible	SK
7/8	100	6	106	A5, A278, A151, A79(BJO), A151, AL51?, A64, M618, A230	A79: moving fast. At 0939 a walrus swam by V1 causing most of sea lions to get up, ten dispersed, walrus remained 5 minutes	BJO
7/9	94	14	108	A230, A64, X3, A253		BJO
7/10	126	2	128	A79, A278, A151, A64, A253		BJO
7/11				T64	no photo available	Terry
7/12	150	21	171	T6		BJO
7/13	181	11	192	T6, F1135, A278	A278: Couldn't see all of last number	BJO
7/14	156	14	170	08:38 - None obs. by BJO; 12:00 - A281, A253, A267 (no photos); 19:40 - A230 (BJO photo); 22:00 - A255, M618, A228 (SK no photo).		BJO
7/15	193	4	197	A228, A256, A64, A255, red flipper tag.	red tag was on a flipper sticking out from a mass of bodies. Couldn't tell which flipper it was on.	BJO
7/16	232	0	232	X3, A64, A278, A79, F1135, A23?	A23?, couldn't see # after 3.	BJO
7/17	185	8	193	A228, A230, A255	A255 looks thin	DCO, BJO
7/18	50	150	200	A278, A228, A263, A151, A266, M618, T6, F1135		DCO, BJOS LK
7/19	130	20	150	M618, A228, A39, X4		SLK
7/20	77	32	109	A228, A256, M618, T6, X3		BJO
7/24	120	4	124	Yellow flipper tag X3, A238, A278, Red flipper tag		DCO
7/31	176	6	182	A278, A230		WAG
8/2	192	36	228	A281, A22?, A79, A151		DCO
8/4	120	4	124	A151, A64, A263	deleted file 1-4 and restarted camera with enough memory for rest of season.	DCO
8/8	118	2	120	A228, A263	camera not working at 14:52	DCO
8/10	71	4	75	A278, M618, A54, A5	fixed camera	DCO

Appendix E. Continued.

Date 2005	Land Count (ave 2 cts)	Water Count (ave 2 cts)	Total	Brands/Tags	Comments	Observer
7/5	62	3	65	A255, A151, A256, A281, one suckling behavior	one suckling behavior	DCO
7/7	100	0	100	F1135, A278, X3, A5, A228	F1135: possible	SK
7/8	100	6	106	A5, A278, A151, A79(BJO), A151, AL51?, A64, M618, A230	A135,A228:brand poor A79: moving fast. At 0939 a walrus swam by V1 causing most of sea lions to get up, ten dispersed, walrus remained 5 minutes	BJO
7/9	94	14	108	A230, A64, X3, A253		BJO
7/10	126	2	128	A79, A278, A151, A64, A253		BJO
7/11				T64	no photo available	Terry
7/12	150	21	171	T6		BJO
7/13	181	11	192	T6, F1135, A278	A278: Couldn't see all of last number	BJO
7/14	156	14	170	08:38 - None obs. by BJO; 12:00 - A281, A253, A267 (no photos); 19:40 - A230 (BJO photo); 22:00 - A255,M618,A228 (SK no photo).		BJO
7/15	193	4	197	A228, A256, A64, A255, red flipper tag.	red tag was on a flipper sticking out from a mass of bodies. Couldn't tell which flipper it was on.	BJO
7/16	232	0	232	X3, A64, A278, A79, F1135, A23?	A23?, couldn't see # after 3.	BJO
7/17	185	8	193	A228, A230, A255	A255 looks thin	DCO,BJO
7/18	50	150	200	A278, A228, A263, A151,A266,M618,T6, F1135		DCO,BJOS LK
7/19	130	20	150	M618, A228,A39, X4		SLK
7/20	77	32	109	A228, A256, M618, T6, X3 Yellow flipper tag		BJO
7/24	120	4	124	X3, A238, A278, Red flipper tag		DCO
7/31	176	6	182	A278, A230		WAG
8/2	192	36	228	A281, A22?,A79,A151		DCO
8/4	120	4	124	A151, A64, A263	deleted file 1-4 and restarted camera with enough memory for rest of season.	DCO
8/8	118	2	120	A228, A263	camera not working at 14:52	DCO
8/10	71	4	75	A278, M618, A54, A5	fixed camera	DCO

Appendix F. Seabird population counts from Observation Point, Round Island 2005.

2005 POPULATION COUNT - PLOT 1 - MAIN BEACH FROM OBSERVATION POINT										
Date	Count Number	Start Time	Finish Time	Number of COMU	Number of BLKI	Number of BLKI nest	Number of PECO	Number of PECO Nest	Number of HOPU	Number of TUPU
2-Jun	CT 1	1131		74	32	30	0	0	0	0
	CT 2		1143	65	34	31	0	0	0	0
5-Jun	CT 1	1044		109	34	27	0	0	0	0
	CT 2		1053	104	30	29	0	0	0	0
8-Jun	CT 1	1510		77	29	26	0	0	1	0
	CT 2		1516	81	28	25	0	0	1	0
11-Jun	CT1	1609		45	24	24	0	0	0	0
	CT2		1613	46	24	24	0	0	0	0
14-Jun	CT 1	1203		115	27	26	0	0	0	0
	CT2		1210	117	27	26	0	0	0	0
17-Jun	CT1	1548		88	25	23	0	0	0	0
	CT2		1553	89	25	23	0	0	0	0
20-Jun	CT1	1300		113	26	22	0	0	0	0
	CT2		1309	87	26	21	0	0	0	0
23-Jun	CT1	1150		82	7	7	0	0	0	0
	CT2		1156	84	7	7	0	0	0	0
26-Jun	CT1	1259		98	17	17	0	0	0	0
	CT2		1303	94	17	17	0	0	0	0
29-Jun	CT1	12:42		64	20	19	0	0	0	0
	CT2		12:49	66	20	19	0	0	0	0

2005 POPULATION COUNT - PLOT 2 - MAIN BEACH FROM OBSERVATION POINT										
Date	Count Number	Start Time	Finish Time	Number of COMU	Number of BLKI	Number of BLKI nest	Number of PECO	Number of PECO Nest	Number of HOPU	Number of TUPU
2-Jun	CT 1	1146	1203	116	94	48	19	11	0	0
	CT 2			118	102	45	19	12	0	0
5-Jun	CT 1	1048	1106	178	107	50	19	11	0	0
	CT 2			187	104	51	20	11	0	0
8-Jun	CT 1	1706		89	92	71	19	11	0	0
	CT 2		1733	78	95	66	19	11	0	0
11-Jun	CT1	1616		55	91	74	13	12	0	0
	CT2		1628	50	91	77	14	13	0	0
14-Jun	CT1	1201		162	78	69	21	13	0	0
	CT2		1218	160	78	75	20	13	0	0
17-Jun	CT 1	1543		90	83	67	21	13	0	0
	CT2		1603	88	86	70	22	13	0	0
20-Jun	CT1	1305		172	70	64	21	12	0	0
	CT2		1340	162	75	67	22	12	0	0
23-Jun	CT1	1124		165	67	58	19	12	0	0
	CT2		1137	165	65	56	20	12	0	0
26-Jun	CT1	2005		72	87	60	19	12	0	0
	CT2		2022	70	89	64	18	12	0	0
29-Jun	CT1	1300		147	64	55	23	11	0	0
	CT2		1307	141	59	56	23	11	0	0

Appendix F. Continued.

2005 POPULATION COUNT - PLOT 3 - MAIN BEACH FROM OBSERVATION POINT

Date	Count Number	Start Time	Finish Time	Number of COMU	Number of BLKI	Number of BLKI Nest	Number of PECO	Number of PECO Nest	Number of HOPU	Number of TUPU
2-Jun	CT 1	1322	1336	74	79	56	9	6	0	0
	CT 2			76	73	55	9	6	0	0
5-Jun	CT 1	1057	1103	53	78	51	7	6	0	0
	CT 2			54	83	51	7	6	0	0
8-Jun	CT 1	1525	1535	61	92	61	7	6	0	0
	CT 2			58	87	61	7	6	0	0
11-Jun	CT1	1629	1641	1	61	61	7	6	0	0
	CT2			1	62	58	7	6	0	0
14-Jun	CT1	1300	1310	26	67	56	9	7	0	0
	CT2			29	64	55	9	7	0	0
17-Jun	CT1	1604	1620	13	67	52	6	6	0	0
	CT2			12	63	51	6	6	0	0
20-Jun	CT1	1310	1328	77	66	50	7	5	0	0
	CT2			84	68	50	7	5	0	0
23-Jun	CT1	1138	1148	29	52	50	8	6	0	0
	CT2			27	56	50	9	6	0	0
26-Jun	CT1	1310	1320	55	52	43	9	6	0	0
	CT2			61	55	40	9	6	0	0
29-Jun	CT1	1319	1329	67	47	37	9	6	0	0
	CT2			74	44	39	9	6	0	0

2005 POPULATION COUNT - PLOT 4 - MAIN BEACH FROM OBSERVATION POINT

Date	Count Number	Start Time	Finish Time	Number of COMU	Number of BLKI	Number of BLKI Nest	Number of PECO	Number of PECO Nest	Number of HOPU	Number of TUPU
6/2/2005	CT 1	1230	1256	467	128	88	0	0	0	0
	CT 2			401	111	84	0	0	0	0
6/5/2005	CT 1	1109	1131	555	101	89	0	0	0	0
	CT 2			598	103	90	0	0	0	0
6/8/2005	CT 1	1637	1654	345	109	98	0	0	0	0
	CT 2			357	110	101	0	0	0	0
6/11/2005	CT1	1646	1654	102	107	92	0	0	0	0
	CT2			96	102	90	0	0	0	0
6/14/2005	CT1	1222	1241	478	94	86	0	0	0	0
	CT2			500	90	87	0	0	0	0
6/17/2005	CT1	1556	1610	230	100	85	0	0	0	0
	CT2			244	103	87	0	0	0	0
6/20/2005	CT1	1342	1350	517	72	68	0	0	0	0
	CT2			516	79	71	0	0	0	0
6/23/2005	CT1	1200	1222	603	65	59	3	0	0	0
	CT2			586	66	64	3	0	0	0
6/26/2005	CT1	1332	1342	438	95	65	0	0	0	0
	CT2			423	94	67	0	0	0	0
6/30/2005	CT 1	1052	1055	141	2	2	0	0	0	0
	CT2			134	2	2	0	0	0	0

Appendix F. Continued.

2005 POPULATION COUNT - PLOT 5 - MAIN BEACH FROM OBSERVATION POINT

Date	Count Number	Start Time	Finish Time	Number of COMU	Number of BLKI	Number of BLKI Nest	Number of PECO	Number of PECO Nest	Number of HOPU	Number of TUPU
6/2/2005	CT 1	1207	1213	128	0	0	0	0	0	0
	CT 2			137	0	0	0	0	0	0
6/5/2005	CT 1	1114	1119	110	0	0	0	0	0	0
	CT 2			105	0	0	0	0	0	0
6/8/2005	CT 1	1620	1622	89	0	0	0	0	0	0
	CT 2			103	0	0	0	0	0	0
6/11/2005	CT1	1642	1645	41	6	4	0	0	0	0
	CT2			41	6	4	0	0	0	0
6/14/2005	CT1	1215	1220	129	5	5	0	0	0	0
	CT2			130	5	5	0	0	0	0
6/17/2005	CT1	1615	1620	76	13	6	0	0	0	0
	CT2			77	13	6	0	0	0	0
6/20/2005	CT1	1334	1340	119	5	5	0	0	0	0
	CT2			117	5	5	0	0	0	0
6/23/2005	CT1	1225	1231	136	7	7	0	0	0	0
	CT2			123	7	7	0	0	0	0
6/26/2005	CT1	1323	1330	91	1	1	0	0	0	0
	CT2			96	1	1	0	0	0	0
6/30/2005	CT1	1110	1117	567	81	60	0	0	0	0
	CT2			565	81	61	0	0	0	0